APPENDIX V

MUFFLE FURNACE FOR TEMPERING AND ANNEALING STEEL AT THE PETROGRAD ARSENAL d>

THIS furnace supplies an interesting example of the application of hydraulic laws to the computation of furnaces. An old furnace of English construction with a cast-iron muffle and four dampers, working with an updraft, was in operation at the Petrograd Arsenal. It did not heat well and the heat was poorly distributed.

This furnace was replaced by a very costly one, which was constructed according to a German patent and also worked with an updraft. The muffle was of brick. This furnace, notwithstanding its complex design, could never be made to heat uniformly.

Upon the request of the superintendent of the forge, Professor Groume-Grjimailo studied the conditions and recommended the reconstruction of the old English furnace, in such a manner that it would work on *the downdraft principle.* This was done according to Figs. **133** to 136. The binding of the furnace was not altered.

After reconstruction the furnace worked perfectly. It was practically impossible to detect any difference in temperature between "the different portions of the large muffle (3600 X1000 X 100 mm) by the use of two Le Chatelier pyrometers. The temperature of the muffle could be changed as desired, and it could be made to vary between large limits (900° to 400°) by changing the setting of the damper in the waste-gas flue.

A short calculation was made later concerning this furnace. The computed consumption of fuel was 55 kg 80 per hour, about 640 kg per day. The actual consumption per day was 690" kg. This estimate was based entirely upon the analysis of the gases at different points within the furnace.

A cast-iron muffle was chosen for this furnace.

A similar

(1) *Revue de la Societt russe de Mttallurgie, /, pp. 4%3~426 (1913}.* *Revue*

de Metallurgie, mai 1914 (p. 115, MS.).